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Ser 1832.4/L7029  
12 Nov 1996

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To: Distribution

Subj: RESPONSE TO COMMENTS ON THE RADIATION INVESTIGATION OF THE TIDAL AREA SURROUNDING IR-02 DRAFT TECHNICAL MEMORANDUM, ENGINEERING FIELD ACTIVITY, WEST, NAVAL FACILITIES ENGINEERING COMMAND, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

Encl: (1) RESPONSE TO COMMENTS ON THE RADIATION INVESTIGATION OF THE TIDAL AREA SURROUNDING IR-02 DRAFT TECHNICAL MEMORANDUM

1. Enclosure (1) is the Navy's response to comments from the Department of Health Services and the United States Environmental Protection Agency on The Radiation Investigation of the Tidal Area Surrounding IR-02 Draft Technical Memorandum, Engineering Field Activity, West, Naval Facilities Engineering Command, Hunters Point Shipyard.

2. If you have any questions regarding this enclosure, please contact Ms. Luann Tetirick, Code 1832.4, at (415) 244-2561, FAX (415) 244-2654.

**Original signed by:**

RICHARD E. POWELL  
By direction of  
the Commanding Officer

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**RESPONSE TO CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY (CAL/EPA),  
DEPARTMENT OF HEALTH SERVICES (DHS)  
COMMENTS ON THE RADIATION INVESTIGATION  
OF THE TIDAL AREA SURROUNDING IR-02  
DRAFT TECHNICAL MEMORANDUM**

The following are Navy's responses to DHS's comments on the radiation investigation of the tidal area surrounding IR-02 draft technical memorandum dated June 13, 1996.

**GENERAL COMMENTS:**

**Comment 1**                      **There is very little "technical information" provided in this document. If extensive explanations are given in the referenced documents, then more specific information should be provided of what the referenced information will tell the reader and specifically where this information is located in the referenced document.**

**Response**                      The technical memorandum addressing the tidal area surrounding IR-02 is intended to be a summary of the information collected by the Navy. A considerable amount of data was collected during phases I and II of the radiation investigation at Hunters Point Shipyard (HPS). The Navy used the surface confirmation radiation survey (SCRS) report and the results of the subsurface radiation investigation in Parcels B and E report as the primary sources to evaluate the tidal area surrounding IR-02. Findings and recommendations were based on a review of air photos spanning approximately 40 years, an evaluation of the data collected during the surface and subsurface investigations in IR-02, and discussions with the Radiological Affairs Support Office (RASO) related to past activities at IR-02.

Based on this information the Navy determined that the probable scenario to explain how and when radium-containing point sources were deposited on the surface in the tidal area was sloughing during storage and relocation of construction materials and debris throughout IR-02 over a 15-20 year period. The relocation of point sources occurred after disposal of the radioactive material in a central location. When construction material was temporarily stored and relocated using standard construction equipment (e.g. front loader), a few inches of soil is usually excavated with the material handled; thus, any point sources deposited within the first few inches of soil could be easily relocated during general operations at the site.

One of the significant relationships observed in the field during the subsurface investigation was the one between the detection of radioactive material and industrial debris. The radioactive material was found at depth almost exclusively with industrial debris. No industrial debris was observed in the test pits excavated in the tidal area and no radioactive material was detected at depth. Trench and test pit logs that contain soil descriptions, debris type and percent volume estimates, radiation field measurements, and sample results are provided in Appendix B of the results of the subsurface radiation investigation in Parcels B and E draft report.

**Comment 2**

**It is not conclusive from the information presented in this document that the area has been fully and adequately characterized. (DHS has not been requested to review the two volume draft or final versions of the "Basewide Environmental Baseline Survey.")**

**Response**

The Basewide Environmental Baseline Survey referenced in the draft technical memorandum was used as a source for the air photography interpretation of the historical development of the Bay Fill Area (IR-02). Copies of the text and graphics used to evaluate the tidal area are included as an attachment.

**SPECIFIC COMMENTS:**

**Comment 1**

**Page 8, Section 3.3.3, Results. The 12 inch maximum depth that a 1 microcurie radium-containing point source could be detected in the field is very conditional. Many factors can affect the detection limits, including shielding of radiation from the various types of soil, rocks and debris in the soil, the efficiency of the detector used in the survey to detect "radium" or its progeny and the presence of radium containing point sources having activity less than 1 microcurie. Another detection limitation which has not been addressed is how well the subsurface surveys performed could laterally detect sources in the walls of the trenches.**

**Response**

The Navy agrees that the maximum depth that a radium-containing point source can be detected varies depending on the shielding capabilities of the soils and debris, the efficiency of the detector for Radium-226 and its progeny, detector positioning, and the activity of the source. Radiation investigations performed at other naval facilities addressing the same issues found that the detection of a radium point source at depth ranges between 12 and 18 inches below the surface using a 2-inch by 2-inch sodium iodide (NaI) detector.

The distance from the detector that radioactive material could be detected in the side walls of the trench and test pits was assumed to be no more than the maximum depth of detecting a source from the surface; however, effective scattering, geometry changes, and other factors do affect the detection of radioactive material in the trench wall at depth. Field technicians found that radioactive material could be detected laterally within the first 6 inches of the trench walls. The purpose of the subsurface investigation was to delineate the surface and subsurface extent of the radioactive material and confirm that the material was exclusively radium-226 and its progeny, not conclusively locate all the radioactive material at the site.

**Comment 2**

**Page 11, Section 4.0, Summary of Conclusions. It is not obvious to DHS from the data presented or from the maps showing the locations of the detected point sources that these point sources were all deposited due to general disposal activities or that the outer sources detected are the extent (distance or depth) of the deposition.**

**Response**

The Navy agrees that it is not readily apparent that the point sources detected in the tidal area were redeposited due to general storage activities in IR-02; however, the Navy has concluded that the most plausible scenario that could explain the surface and subsurface distribution of radioluminescent point sources in IR-02, which includes the point sources detected at the surface in the tidal area, was due to general storage and relocation of construction materials and various debris throughout HPS.

**Comment 3**

**Page 11, Section 5.0, Recommendations. DHS agrees that it would be prudent to remove and properly dispose of the point sources detected, but cannot agree that additional subsurface characterization of the tidal area will not be necessary.**

**Response**

The Navy feels that the remedial investigation has adequately characterized the nature and extent of the radioactive material in the tidal area surrounding IR-02. This investigation of the tidal area surrounding IR-02 will be incorporated in the upcoming parcel remedial investigation and feasibility study reports scheduled to be submitted in 1997. At that time the nature and extent of the radioactive material, risk to human health and the environment, and possible cleanup alternatives will be evaluated, and submitted for regulatory agency review and comment. The Navy assumes that any concerns DHS and DTSC have regarding the need for additional subsurface characterization can be met within that framework.

**RESPONSE TO U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)  
COMMENTS ON THE RADIATION INVESTIGATION OF THE TIDAL AREA  
SURROUNDING IR-02 DRAFT TECHNICAL MEMORANDUM**

The following are the Navy's responses to the EPA's comments on the radiation investigation of the tidal area surrounding IR-02 draft technical memorandum dated June 13, 1996.

**SPECIFIC COMMENTS:**

**Comment 1**

**Section 5.0, page 11: The second recommendation "relocate, remove and properly dispose of the point sources detected at the surface" needs clarification. Is this recommendation for the tidal area only? Also, to what depth in the tidal area sediments would constitute surface?"**

**Response**

The technical memorandum is only addressing the beach and tidal area surrounding IR-02.

After an evaluation of the field and analytical data collected in phase I and II of the radiation investigation at HPS, it does not appear that radioactive material was disposed of in the beach and tidal area surrounding the Bayfill Area (IR-02). To assist the Navy in evaluating whether radioactive material was deposited in the beach and tidal area surrounding IR-02 test pits were excavated to evaluate the subsurface conditions. The test pits uncovered little debris in the tidal area; no industrial debris was observed. When evaluating the data collected to date it is the Navy's position that the few point sources detected within the first 12 inches of soil are there due to the first few inches of soil being inadvertently relocated due to general storage and disposal activities in the area during a 25 year period. The recommendation that the "surface point sources will be relocated, removed and disposed of" is a bit misleading. Most environmental sampling defines a surface soil sample as a sample collected within the first 6 inches soil. The surface radiation survey (phase I) in the tidal found the point sources within the first 12 inches of sediment; and most were within the first 6 inches. Hence, the Navy is expecting to relocate the point sources within the same 12 inches of sediment. The sentence in the final draft of the technical memorandum will be modified to read, "The point sources will be relocated using radiation detection equipment that is able to detect a point source at a depth equal or greater than 12 inches below ground surface (bgs)." Many field studies have shown that a 2-inch by 2-inch sodium iodide (NaI) detector is able to detect a one microcurie Radium-226 source at a depth of 12 inches bgs.

Groundwater in the aquifers generally flows toward San Francisco Bay except in Parcel D. where groundwater flows inland from the bay and the vertical gradient between the aquifers is generally upward. Contaminated groundwater has been identified and delineated in Parcels B, C, and E. Detected contaminants include TPHs, solvents, and metals. Contaminants are generally limited to the artificial fill but have been detected in the undifferentiated upper sands and top several feet of bay mud in limited areas.

The removal action for this project will involve source control and groundwater remediation or isolation of each affected groundwater area. The Navy is currently conducting an EE/CA to evaluate the removal of affected groundwater at IR-01 in Parcel E. Groundwater contamination at IR-10, IR-24, IR-25, IR-26, and IR-46 in Parcel B, at IR-28 in Parcel C will be addressed later on in the feasibility study for each of these parcels.

#### 5.4 INTERVIEWS

Interviews were part of the VSI process. Interviews were held daily with base security department personnel and environmental personnel regarding the areas to be inspected that day during the VSI. Since most areas were unoccupied, interviews with specific building or site personnel frequently were not possible. Tenants or Navy representatives were interviewed for occupied locations when available. The interviews provided additional information regarding the past and current operations at HPA. Appendix B contains a summary of the interviews conducted during the VSI.

#### 5.5 AERIAL PHOTOGRAPHY ANALYSIS

The objectives of the aerial photography analysis were to document geomorphic and land use changes at HPA over time and to identify areas of concern (AOC) that might indicate prior releases of chemicals to the environment. Five aerial photographs were selected for review to cover several periods of development at HPA: pre-Navy (1935), World War II (1946), post-war (1969), Triple A's tenancy (1985), and present-day activities (1994). Many of the AOCs identified during the aerial photography analysis were located within IRP sites currently being investigated or were outside the HPA boundaries. Further study would be required to evaluate whether any of the AOCs should be

investigated as previously unidentified sources of contamination. A discussion of the specific AOCs may be found in the aerial photograph review report in Appendix C.

The aerial photograph from the pre-Navy period (1935) showed very limited development in the HPA area. The primary land use at the time was agricultural, with a small amount of apparent industrial activity in the area of Dry Docks 2 and 3. Numerous piers extending into the bay along the north shore of the peninsula and one southwest of the dry docks indicated ongoing maritime activities. Some apparent residences were scattered across the adjacent uplands areas. A low-lying area to the southwest, adjacent to what is now HPA, was a mixture of open agricultural land and developed residential and industrial blocks.

By 1946, only the immediate vicinity of the original dry docks remained substantially unchanged from their appearance in 1935. Housing units had been established on the highlands of HPA (Parcel A) while portions of the ridge had been leveled to fill in the bay in Parcels B through E. The low-lying areas were dedicated to industrial activities except for part of the southern shoreline of Parcel E, where temporary Quonset hut housing had been built. The land area of HPA had increased only slightly by 1969, with the placement of a large amount of new fill in the landfill area of Parcel E and in the northwest corner of Parcel B (IR-7). The only significant land change from 1969 to the present was the filling of a slough in the landfill area of Parcel E.

## 5.6 TITLE DOCUMENT REVIEW

The title document review uncovered a very limited amount of information about businesses in the HPA vicinity prior to the Navy purchase of the property. Despite the availability of court records that listed the recorded property owners at the time of the sales, no specific information could be found that detailed the improvements to and use of the land along the Hunters Point peninsula. Most of the land was undeveloped or underwater, and the property owners were mostly individuals with no obvious connection to any industrial activity. Aside from the land around Dry Docks 2 and 3, which was owned by Bethlehem Steel Corporation, several blocks were owned by the South San Francisco Dock Company (Figure 5-7). The company probably maintained one or more piers in the area, but no Hunters Point address for the company was found in the title documents reviewed. The Houghton

## **1.0 INTRODUCTION**

This report was prepared by Harding Lawson Associates (HLA) under contract to PRC Environmental Management, Inc. (PRC), for the Department of Navy (Navy), Engineering Field Activities West (EFA West). The report was prepared under Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62474-88-D-5086, Subcontract No. 5086-90-057-004, Contract Task Order 310 (CTO310). This report describes HLA's review of aerial photographs of Hunters Point Annex (HPA), San Francisco, California (Plate 1).

### **1.1 Objectives**

The objectives of the aerial photograph review were to (1) document geomorphic and land use changes at HPA over time and (2) identify areas of concern (AOCs) that may indicate prior potential releases of chemicals to the environment in five aerial photographs spanning approximately 60 years (1935, 1946, 1969, 1985, and 1994).

### **1.2 Report Organization**

The following sections include:

- Historical background regarding usage of the area now known as HPA (Section 2.0)
- A description of the methods used in the aerial photograph review (Section 3.0)
- The findings of the aerial photograph review (Section 4.0)
- A list of references cited in this report (Section 5.0).



## 2.0 HISTORICAL BACKGROUND

The peninsular area known as HPA (Plate 1) has undergone significant geomorphic and demographic changes from the late 1800s to the present. To provide information on historical land uses prior to the earliest available aerial photographs, this discussion mainly summarizes changes that occurred in the area before the Navy's tenure.

Prior to development by the Navy in the early 1940s, the area primarily comprised an east-to-west trending bedrock ridge that terminated on the east at San Francisco Bay at a point known as Hunters Point. The Hunters Point peninsula was approximately 6,000 feet long, with an average width of 2,000 feet. The southern and southeastern portions of the peninsula consisted of steep cliffs (as high as 170 feet); the northern and northeastern areas sloped more gently toward the bay. Land use in the Hunters Point area included ship repair facilities (within what is now Parcel B), ranching, and sparsely populated residential areas.

Bedrock at this location is primarily serpentinite, which was considered ideal for drydock construction because it was relatively easy to excavate, solid enough to support drydock foundations, and jugged into deep water. Between 1866 and 1919, three drydocks were constructed by various shipping entrepreneurs. Only Drydocks 2 and 3 remain. The land was owned by several companies during this period, including the California Steam Navigation Company, San Francisco Dry Dock Company, and Bethlehem Shipbuilding Company, Ltd. (also known as Bethlehem Steel and Union Iron Works Dry Dock) (Dow, 1973).

In 1940, the Navy purchased the drydocks and immediately subleased them back to Bethlehem Steel to continue operations. In 1941, the Navy officially took possession of the site under the name of Hunters Point Naval Dry Docks and began preparations for World War II. Acquisition of private land began immediately, which included lands to the west, underwater and tidal areas, and Point Avisadero. Construction of Drydock 4 was completed in 1943, after the removal of a 170-foot hillside and the excavation of approximately 5 million cubic yards of earth. Extensive infilling created the land supporting the drydock. By the end of World War II, the total estimated acreage (including under water and land property) at HPA was 979 acres (Dow, 1973).

In 1992, as part of ongoing remedial investigation (RI) activities, HPA was divided into five parcels (A, B, C, D, and E) comprising approximately 90, 66, 77, 128, and 135 land acres, respectively. Section 4.0 of this report summarizes the potential AOCs identified in the aerial photographs in each of these parcels, together with geomorphic changes observed between 1935 and 1994.

### 3.0 AERIAL PHOTOGRAPH REVIEW METHODS

The aerial photograph review was conducted in general accordance with the procedures outlined in *Fundamentals of Remote Sensing and Airphoto Interpretation* (Avery and Berlin, 1992).

#### 3.1 Year Selection Criteria

Stereo-pair aerial photographs from 5 years (1935, 1946, 1969, 1985, and 1994) were reviewed. The photographs were selected to cover several periods of development at HPA: pre-Navy (1935), World War II (1946), post-war (1969), Triple A Shipping's tenure (1985), and present-day tenants/remedial investigation (1994). Other factors used to select the photographs included availability, scale, quality, and stereo-pair coverage.

#### 3.2 Scale and Grid

Stereo-pair aerial photographs were selected at a scale of 1:12,000, which correlates to a scale of approximately 1 inch equals 1,000 feet laterally on the photographs (Appendix). Because distortion occurs during both the photographing of the land surface and the reproduction of the prints (Bomshay, 1995), ground-truthing (and/or comparison to the base map) is recommended if distances are measured directly from the aerial photographs.

A grid system was developed to isolate areas for review. Plate 2 shows the grid superimposed on the HPA facility map. Seven vertical columns (aligned parallel to north) are defined by the capital letters A through G, and seven horizontal rows are defined by the numbers 1 through 7. Each resulting grid square has dimensions of 1,000 feet by 1,000 feet, and in turn is divided into quadrants (subcells) of equal area (500 feet x 500 feet). The subcells are designated with lower case letters (clockwise a, b, c, and d from upper middle). For example, the southeast subcell in Column B, Row 5 is designated B5c.

#### 3.3 Identification Process

The review of the stereo-pair aerial photographs included the use of stereoscopes to evaluate whether an object has topographic relief and magnifying equipment and single photographs to approximate lateral distances for placing potential AOCs on the HPA facility maps created for each photograph (Plates 3 through 7). Some areas were not reviewed stereoscopically, depending on the stereo-pair coverage for a particular year. Each subcell was reviewed for the presence of pavement; however, identification of pavement at the scale of the photographs used in this review is difficult and subject to interpretation. In general, it was assumed that most areas were not paved in 1935. Additionally, each subcell was reviewed for its demographic status as a residential, industrial, or open area; industrial areas include commercial buildings (e.g., offices) and open areas include agricultural lands and previous developed lands left fallow. Some open areas may have been subjected to industrial operations if they were dumping grounds for industrial wastes; in other words, open areas are not pristine "open space," rather they simply do not have buildings on them.

Following a review of each subcell, potential AOCs were described and recorded in Tables 1 through 5 in accordance with the procedures presented in the following sections. If more than one AOC was encountered in a subcell, all were recorded in the tables as separate entries. The entries are listed in a clockwise fashion. For example, if a subcell contained three AOCs, the one closest to "12:00" was recorded first and the other two were listed clockwise. If part of an AOC extended into another subcell, those subcells are listed after the subcell that contained most of the AOC. Potential AOCs that corresponded geographically to Installation Restoration (IR) sites have been noted in the tables. Where AOCs were noted adjacent to several IR sites, all of the sites are listed in the tables.

### **3.3.1 Potential Areas of Concern**

The stereo-pair aerial photographs were reviewed for indications of the potential for chemicals to be released to the environment; these indications were reported as potential AOCs. Discolorations on the ground surface indicating the release of fluids that might or might not pose a threat to the environment were recorded as potential AOCs. Similarly, areas or objects that appeared from an aerial perspective to be debris areas (of an industrial nature) or containment structures (drums, aboveground storage tanks [ASTs], etc.) were recorded as potential AOCs. This conservative approach was maintained to avoid elimination of areas that appear innocuous but in fact pose a possible threat to the environment (e.g., an AST that appears to be a water tank but which actually contains a petroleum hydrocarbon product).

Potential AOCs include, but are not limited to, the following:

- Apparent stains (may include ponded surface water)
- Drums
- ASTs
- Debris areas
- Construction areas
- Apparent filled or mounded areas
- Disturbed soil.

### **3.3.2 Confidence Level**

Once potential AOCs were identified, a confidence rating between 1 and 5 was assigned, with 1 representing the lowest confidence that the area is a potential AOC and 5 the highest confidence level. Confidence levels, together with any specific comments regarding the AOCs, have been recorded on Tables 1 through 5.

## 4.0 FINDINGS

This section discusses the findings of the aerial photograph review. General geomorphic changes in the HPA area are described in Section 4.1. Sections 4.2 through 4.6 summarize apparent land uses and the AOCs identified in the aerial photographs. Tables 1 through 5 summarize the reviews of the 1935, 1946, 1969, 1985, 1994 aerial photographs, respectively. Plates 3 through 7 show the demographic status (i.e., residential, industrial, or open area) of the site and graphically portray the potential AOCs, relative to their position on the grid and the HPA facility. Parcel boundaries are shown to facilitate identification of the potential AOCs relative to known contamination at IR sites. Areas immediately outside the HPA facility border (but inside the grid) were also reviewed for the presence of potential AOCs.

### 4.1 Geomorphic Changes

As described in Section 2.0, the area known as Hunters Point has undergone significant geomorphic changes since the turn of the century. On the basis of the aerial photographs included in this review, the most significant changes in geomorphology occurred between 1935 and 1946. Land surface contours on the hillside changed as rock/soil was carved away. The previously sparsely populated vegetated (agricultural) hillside was transformed into a populated residential highland (Parcel A) and a heavily industrialized area in the newly filled lowland. The land mass at HPA was significantly increased by infilling of the bay. The configuration of Drydocks 2 and 3 remained unchanged and Drydock 4 and several berthing slips were constructed in the southeastern portion of the site.

Fewer geomorphic changes occurred between 1946 and 1969. The primary change occurred in the fill along the shoreline. The slough area to the southwest (in Parcel E) was filled in, leaving only a narrow channel by 1969. Several areas of the site that were unpaved in 1946 appeared to be paved by 1969, although most of the fill area along the south shore

remained unpaved.

Very few geomorphic changes were observed between 1969 and 1994, and only slight variations in the shoreline are visible. The primary change is the removal of buildings onsite, especially the quonset hut housing and numerous buildings in the southeastern portion of the site (Parcels D and E). By 1994, most of the debris areas near the slough on the southwest (Parcel E) had been removed. By 1994 the dock along the shoreline northeast of Drydock 3 (Parcel B) had collapsed. Drydocks 2 and 3 had become apparently inoperative.

### 4.2 Potential Areas of Concern Identified in Aerial Photograph Review

#### 4.2.1 1935

The primary land use in 1935 was agriculture, with a small amount of industry located mainly along the shoreline to the northeast (Parcels B and C) (Plate 3). Several apparent farms are present throughout the peninsula; several buildings of unknown use are also present. Only a limited number of potential AOCs were observed in the photograph; they are summarized in Table 1.

The primary areas of interest are along the northeastern shoreline near the former Bethlehem Steel Company facility. The 1935 photograph lacks the clarity of later photographs and potential AOCs were identified primarily on the basis of the presence of industrial-looking buildings and historical information. One feature (a possible fill area) was added as a potential AOC primarily because of its possible effect on site hydrogeology, rather than its potential for hazardous waste releases. A physical structure (possibly a fence or wall) in Parcel C was identified on the photograph but not included as a potential AOC. Paving is not apparent in any of the industrial areas in 1935.

#### 4.2.2 1946

As described in Section 4.1, the land area of HPA had increased significantly by 1946. In this year, HPA consisted of industrial and to a lesser extent, residential and open areas (Plate 4). The highlands of HPA (Parcel A) primarily contained housing units, whereas the lowlands of Parcel A and Parcels B through E contained numerous areas and buildings associated with industrial activities. Open areas were observed along the southern shoreline (Parcel E); quonset huts temporarily used to house servicemen were present in the southeastern portion of Parcel E.

Potential AOCs identified in the 1946 aerial photograph include numerous apparent stains, ASTs, possible drums, and oil ponds; they are summarized in Table 2. Locations of the potential AOCs are shown on Plate 4.

#### 4.2.3 1969

Except for the placement of a large amount of new fill in the landfill area of Parcel E and in IR-7 in Parcel B, by 1969, the land area of HPA had only slightly increased over that observed in 1946. The distribution of residential and industrial areas in 1969 is similar to that of 1946. Open space area had increased due to the addition of the fill.

Potential AOCs observed in the 1969 photograph include numerous debris areas, possible drums, ASTs, and apparent stains; potential AOCs are summarized in Table 3 and shown on Plate 5.

#### 4.2.4 1985 and 1994

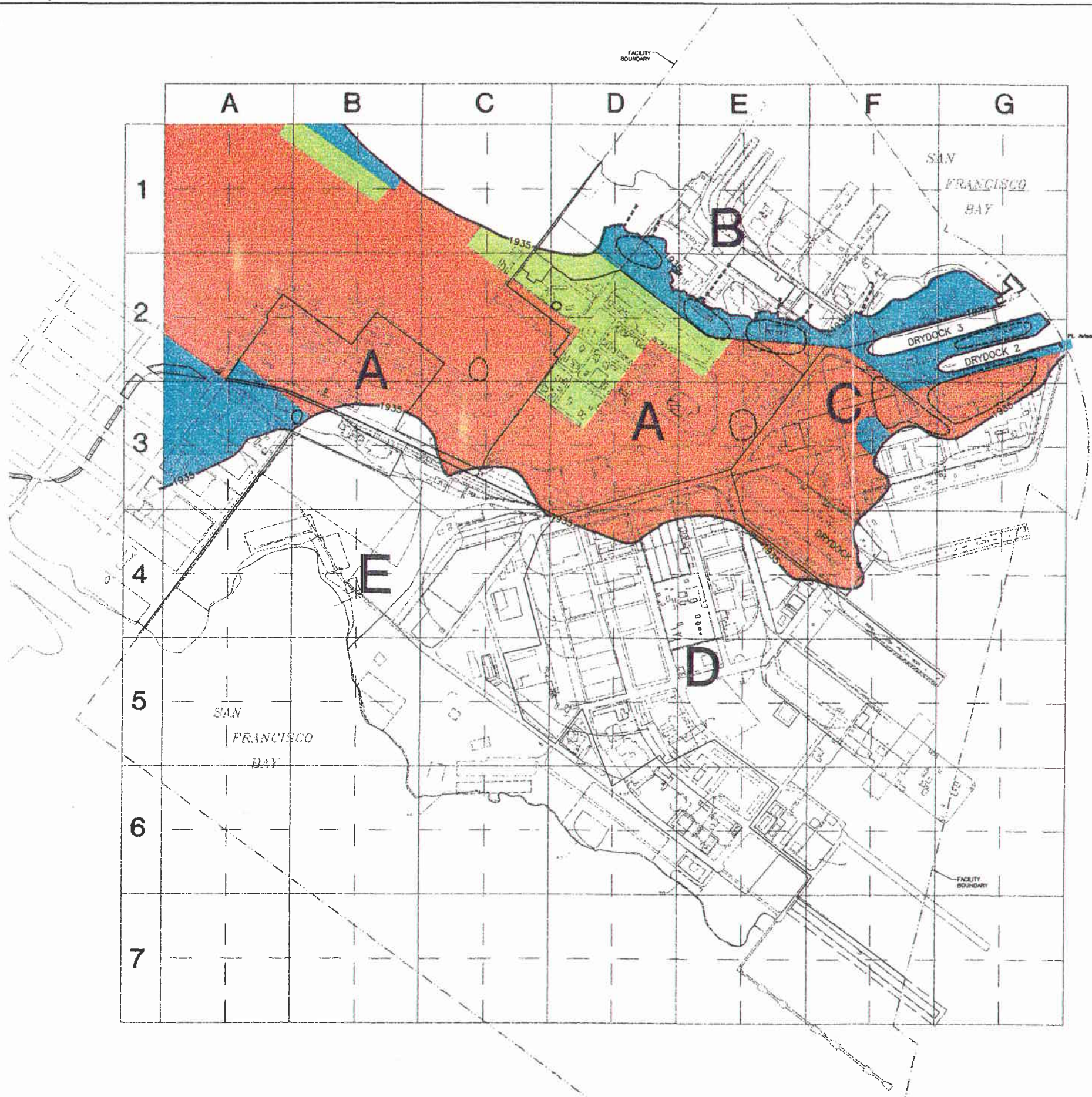
With the exception of final filling of the slough in Parcel E, no significant changes in the land surface were observed between 1969 and the 1994. The residential, industrial, and open areas remained relatively the same, with the following exceptions:

- Quonset hut housing along the southern shoreline had been removed by 1985
- Apparent barracks in Parcel A had been removed by 1985, leaving only building foundations

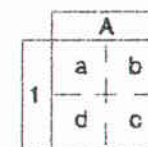
- There appear to be fewer of the debris areas that were observed in open areas in the 1969 photograph (some are possibly covered by vegetation).

Potential AOCs observed in the 1985 and 1994 photos include debris areas, possible drums, ASTs, stains, and fill areas; potential AOCs are summarized in Tables 4 and 5, respectively. Potential AOC locations for 1985 and 1994 are shown on Plates 6 and 7, respectively.





**EXPLANATION:**



GRID SUBCELL DESIGNATIONS



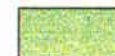
POTENTIAL AREA OF CONCERN



OPEN AREA



INDUSTRIAL AREA



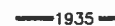
RESIDENTIAL AREA



EXISTING BUILDING



LOCATION OF FORMER BUILDING



1935 SHORELINE



PARCEL BOUNDARY



IR SITE BOUNDARY



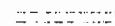
PA SITE BOUNDARY



CRANE OR RAILROAD TRACKS



FENCE



ROADWAY



NO.	DATE	REVISIONS	BY	CHK	DATE
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3					
4					
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DATE:	12/12/95

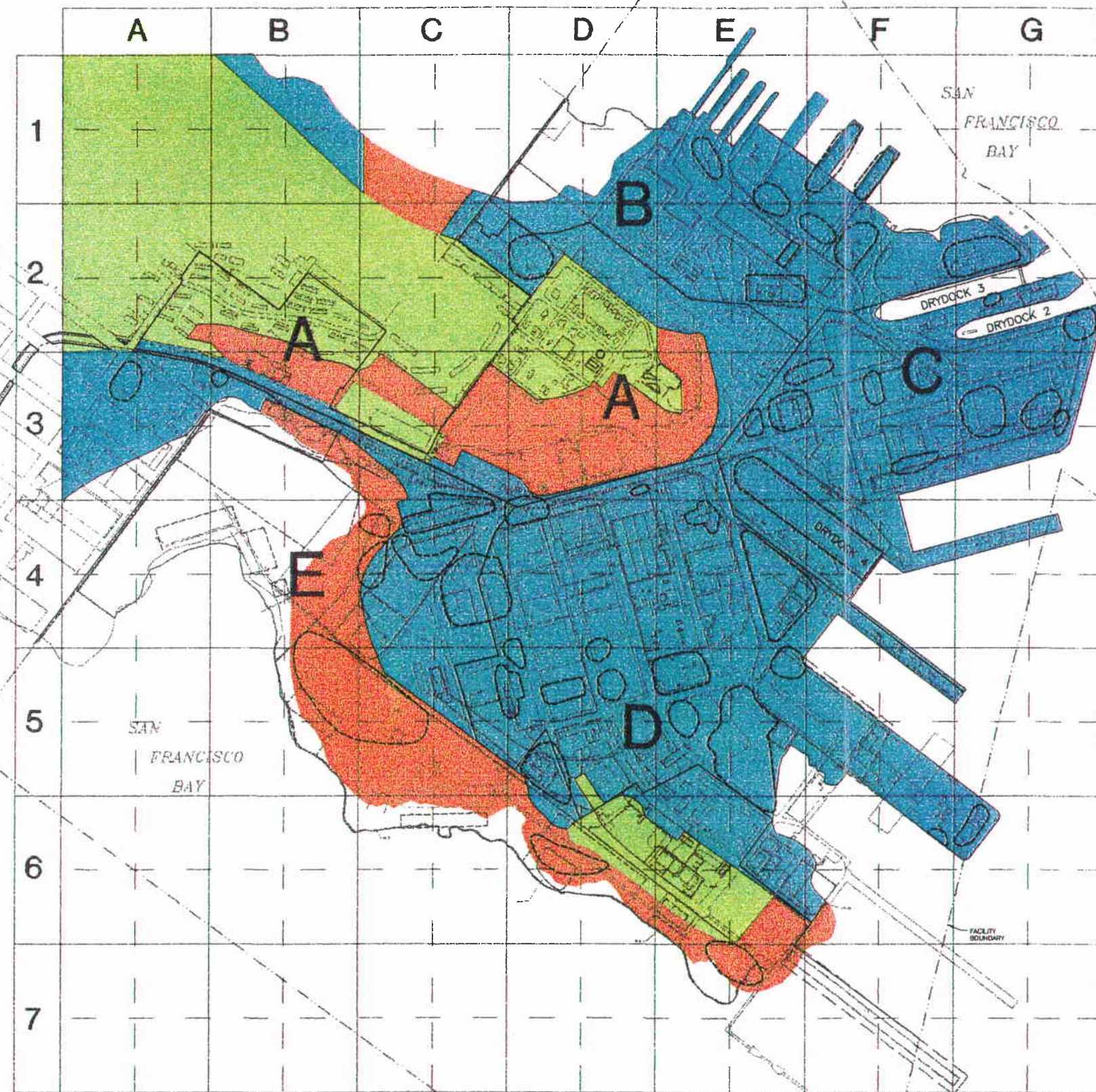
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DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING COMMAND  
ENGINEERING FIELD ACTIVITY WEST  
San Bruno, California  
Aerial Photograph Review Report  
Engineering Field Activity West  
Hunters Point Annex  
San Francisco, California

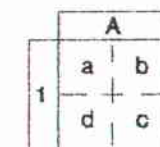
POTENTIAL AREAS OF CONCERN IDENTIFIED  
IN 1935 AERIAL PHOTOGRAPH

PLATE	3
SHEET	1 of 1
REVISION NUMBER	
DATE	11/95





# EXPLANATION:



GRID SUBCELL DESIGNATIONS



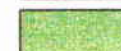
POTENTIAL AREA OF CONCERN



OPEN AREA



INDUSTRIAL AREA



RESIDENTIAL AREA



EXISTING BUILDING



LOCATION OF FORMER BUILDING



1946 SHORELINE



PARCEL BOUNDARY



IR SITE BOUNDARY



PA SITE BOUNDARY



CRANE OR RAILROAD TRACKS



FENCE



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NO.	DATE	REVISIONS	BY	CHK	DATE
1	02/09				
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DRAWN:	PROJECT NO:
ENGINEER:	11400 1905
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DATE:	CAS
	12/24/95

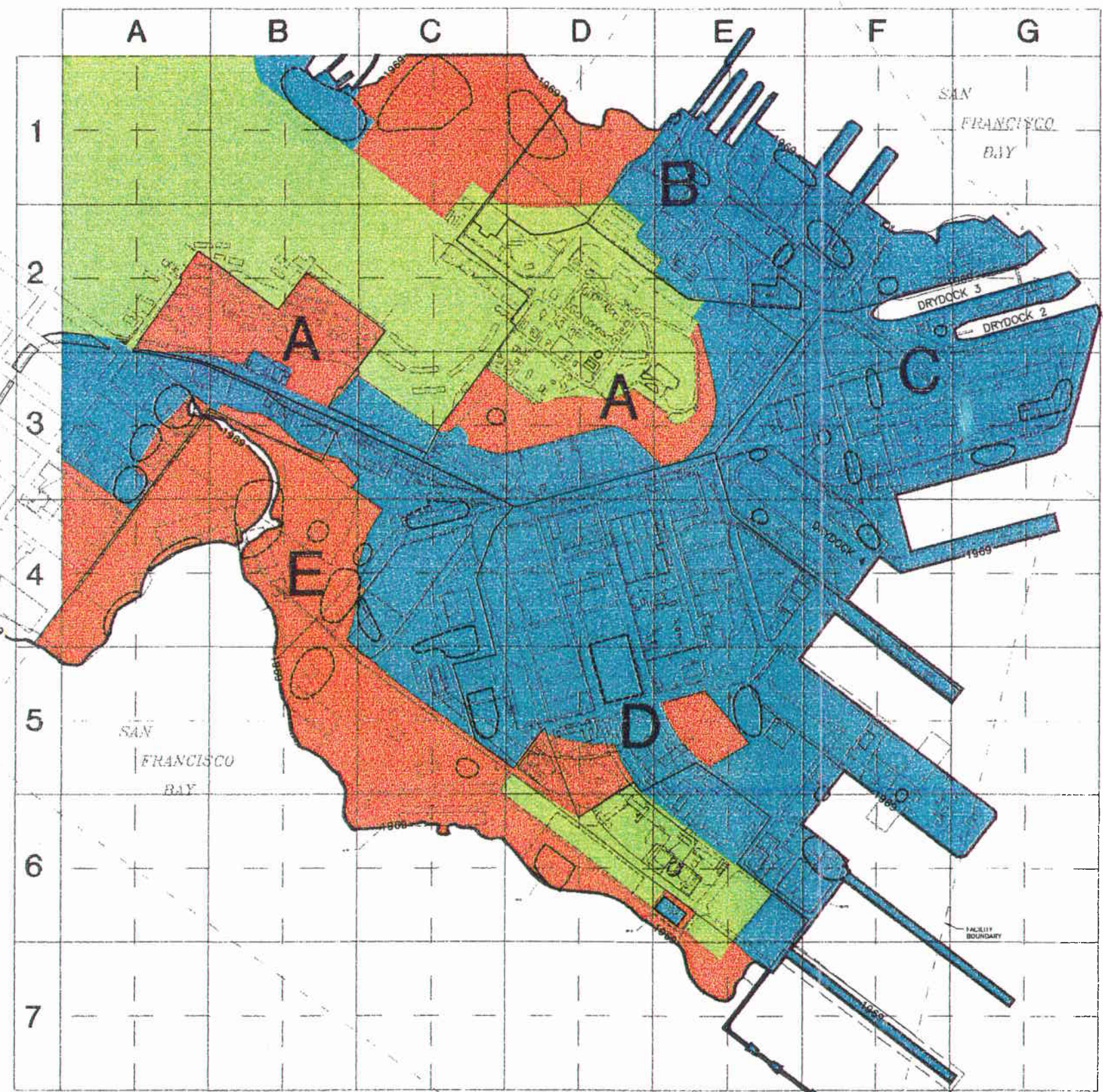
**Harding Lawson Associates**  
Engineering and Environmental Services  
105 Digital Drive  
Novato, California 94948  
Phone: (415) 883-0112

DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING COMMAND  
ENGINEERING FIELD ACTIVITY WEST  
San Bruno, California  
Aerial Photograph Review Report  
Engineering Field Activity West  
Hunters Point Annex  
San Francisco, California

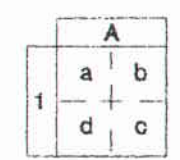
POTENTIAL AREAS OF CONCERN IDENTIFIED  
IN 1946 AERIAL PHOTOGRAPH

PLAT	4
SHEET	1 of 1
REVISION NUMBER	
DATE	11/95





**EXPLANATION:**



GRID SUBCELL DESIGNATIONS



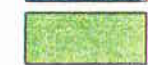
POTENTIAL AREA OF CONCERN



OPEN AREA



INDUSTRIAL AREA



RESIDENTIAL AREA



EXISTING BUILDING



LOCATION OF FORMER BUILDING



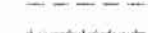
1969 SHORELINE



PARCEL BOUNDARY



IR SITE BOUNDARY



PA SITE BOUNDARY



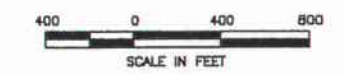
CRANE OR RAILROAD TRACKS



FENCE



ROADWAY



NO.	DATE	REVISIONS	BY	CHK	DATE	DRAWN: CSN	PROJECT NO: 11400 1905
						ENGINEER: CSN	SCALE: 1"=400'
						CHECKED:	APPROVED: CAS
							DATE: 12/22/95

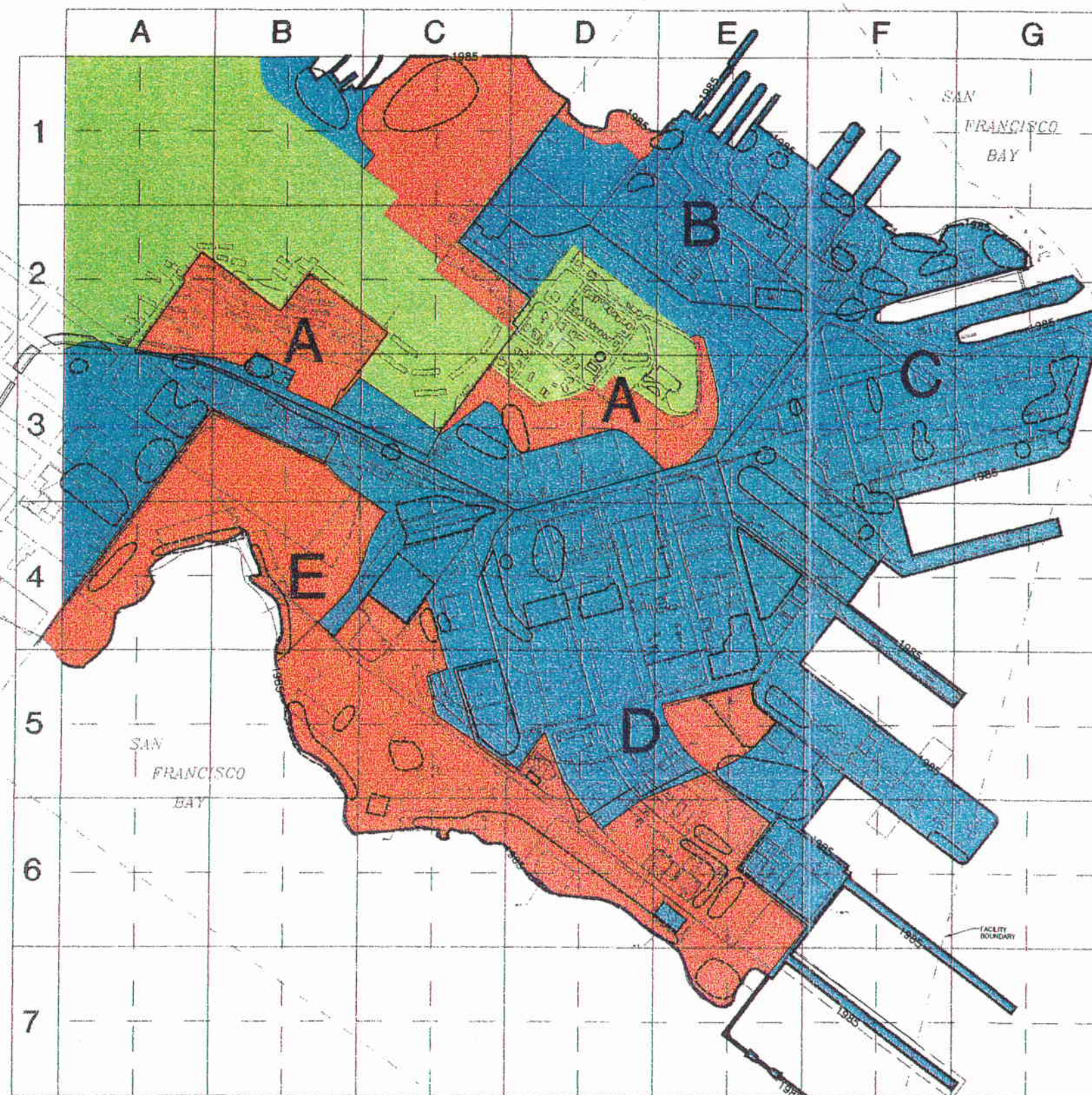
**Harding Lawson Associates**  
Engineering and Environmental Services  
105 Digital Drive  
Menlo Park, California 94025  
Phone: (415) 563-0112

DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING COMMAND  
ENGINEERING FIELD ACTIVITY WEST  
San Bruno, California  
Aerial Photograph Review Report  
Engineering Field Activity West  
Hunters Point Annex  
San Francisco, California

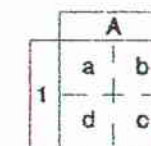
POTENTIAL AREAS OF CONCERN IDENTIFIED  
IN 1969 AERIAL PHOTOGRAPH

PLATE	5
SHEET	1 of 1
REVISION NUMBER	
DATE	11/95





**EXPLANATION:**



GRID SUBCELL DESIGNATIONS



POTENTIAL AREA OF CONCERN



OPEN AREA



INDUSTRIAL AREA



RESIDENTIAL AREA



EXISTING BUILDING



LOCATION OF FORMER BUILDING



1985 SHORELINE



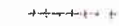
PARCEL BOUNDARY



IR SITE BOUNDARY



PA SITE BOUNDARY



CRANE OR RAILROAD TRACKS



FENCE



ROADWAY

NOTE: NO CHANGES IN SHORELINE OBSERVED AFTER 1975.



SCALE IN FEET

A	02/09	CSH	DRAWN:	PROJECT NO: 11400 1905	ENGINEER:	SCALE: 1"=400'	CHECKED:	APPROVED: CAS	DATE: 12/22/95
NO.	DATE	REVISIONS	BY	CHK	DATE	DATE	DATE	DATE	DATE



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DEPARTMENT OF THE NAVY  
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San Francisco, California

POTENTIAL AREAS OF CONCERN IDENTIFIED  
IN 1985 AERIAL PHOTOGRAPH

PLATE  
6  
SHEET:  
1 of 1  
REVISION NUMBER:  
DATE: 11/95